Notebook, N-08-12-07.1

The only dated entry in this notebook is from December 1908. All entries are by Edison. The book contains notes and drawings regarding the preparation of nickel flake and the loading of the flake into the grids of storage battery cells. Some of the entries indicate the involvement of Walter N. Archer, George H. Hooper, Jr., and Charles Dally. Inserted into the book are 2 pages of notes by Edison. The front cover is labeled "Ent." The pages are unnumbered. Approximately 20 pages have been used.

Dec 7 - 1908

Notes on packing tubes with dif flake & green + varying quantities + other changes to get good side contact without breaking flake + to permit of swell of tube without cracking flake also results from old test tubes By sawing open + slicing mix in soaking treatment with acid - sugar etc to reduce -
Results put on glass with Beeswax for Micro

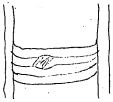
Different ni hydrox act different. 723 acts good - with 104 lot flake, dark flat not ax or 1hm Hydrogen the results are excellent 42 flake

When 718 NiOH is used with 4.8 104 lot f the results are different - we get this

flake at places one sided feed + very bad the dark show

Brake + too much green shows around edges

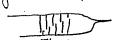
I notice harder lumps thus



The green is not uniform
No 723.

also the side feeding of flake is bad

This is cause of green being thrown to one side of the tubs + packed uneven for a little distance than it gives away as a whole + suffers displacement

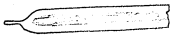


This —

To much flake is bad if it cant be evenly distributed over the whole surface

If we are to use more flake per dump. changes must be made at top dump -

Inactive tubes Hooper Cuts out after drying to 1 volt. how this appeared when cut open



This would imply that tube was not drying The tube is 250/1000 mix whereas this black strank is 125/1000 or a nickel Content of 1/4 of the cobalt — Hence if this is not drying then resistance Etc 1/4 of the Capacity of the tube is below a volt & undurable. The reason may be found in Connection of the mix from the walls, or poor circulation because full Capacity is attained by drying hot —

Old flat pocket green 4.2 flat fl. 104 feeds Eddy- but ends are bad.

Seems that there are but few flakes at Edges most flakes away from edge

this would represent

The amount remaining Edges — Old green

Daily Exports ox black no peacock

	50	100	150
	1252	1217	
Not ox or reduced H-719 723	1217	1240	1228
723	—	—	1259
719	—	—	1197
Ox + thru H Peacock	1199	1166	1132

OVR

Oxidized + thru Hydrogen

	Flask	Gram		Cell	50	100	150
	22	723	9672	1092	1125		
	22	719	9674	1090	1003		
	24	723	9706	1157	1189	1030	Co
	24	719	9708	1068	1263	766	C
Bulky	26	719	9905	1123	1193	1183	1190
	26	723	9907	1162	1255	1241	1133
"	27	719	9909	1150	1198	1188	1097
	27	723	9911	1153	1226	1287	1167
Slightly Bulky	28	719	9913	1176	1243	1232	1078
	28	723	9915	1185	1253	1158	1117
" "	29	719	9917	1190	1205	1106	1060
	29	723	9919	1196	1173	1000	983
Sample wrong	30	719	9921	1188	1192	1040	997
		723	9923	1186	1171	1053	953
Bulky	30	719	9	1215	1235	1120	1160
		723	11	1216	1296	1368	1138
	32	719	13	1201	1283	1271	1260
		723	15	1210	1348	1293	1213
	34	719	17	1079	1162	1135	1160
		723	19	1067	1143	1151	1180
	35	719	21	1043	1175	1168	1183
		723	23	1098	1164	1175	1157
	36	719	25	1200	1215	1210	1188
		723	27	1218	1239	1263	1230
	38	719	29	1240	1255	1078	1157
		723	31	1246	1271	1259	1050
		719	33	1130	1141	1140	1153
Bulky Cindy	37	723	35	1173	1183	1210	1192
Bulky	A1	719	37	1135	1210	1189	1148
		723	39	1140	1240	1260	1255

100 Run

719	1157
723	1206

Whole average	
50 Run	1199
100 "	1166
150	1132

Notoxidized Not Hydrogen ??

	Flask	Gram		Cell	50	100	150	200
Cindy Bulky	22	719	9660	1136	1218	1221	1215	1233
Hole in corner by hand		723	9662	1135	1212	1240	1260	1259
Hole in corner by hand	24	719	9676	1110	1195	1190	1192	
		723	9678	1156	1280	1216	1235	
	25	719	9865	1145	1225	1228	1243	
		723	9867	1175	1228	1280	1297	
Hole in corner Yellow Bulky Bulky	27	719	9869	1140	1208	1221	1242	
		723	9871	1145	1170	1250	1250	
Bulky	33	719	9873	1122	1177	1210	1199	
		723	9875	1148	1186	1242	1263	
"	26	719	9877	1055	1148	1188	1208	
		723	9879	1090	1145	1216	1225	
Vinegar and Hydrogen Bulky	28	719	9881	1150	1183	1226	1252	
		723	9883	1202	1232	1280	1278	
Bulky	29	719	9885	1080	1168	1205	1190	
		723	9887	1148	1211	1355	1398	
	30	719	9889	1126	1205	1211	1240	
		723	9891	1171	1270	1333	1410	
	32	719	9893	1161	1228	1291	1318	
		723	9895	1154	1281	1348	1230	
Bulky	34	719	9897	1100	1160	1223	1190	
		723	9899	1100	1200	1278	1242	
"	36	719	9901	1156	1215	1240	1200	
		723	9903 ?	1127	1237	1271	1260	
"	35	723	9931 ?	1097	1196	1145	1225	
		719	9933	1132	1273	1247	1285	
Slightly Cindy	37	719	9935	1128	1217	1119	1148	
		723	9937	1072	1183	1173	1112	
Bulky	38	719	9939?	1085	1183	1161	1093	
		723	9941	1153	1235	1227	1223	
	39	719	9943	1153	1233	1206	1148	
		723	9945	1143	1295	1311	1243	
Quite Yellow Yellow in it	40	719	9947	1147	1280	1270	1208	
		723	9949	1133	1305	1320	1291	
	41	719	1	1163	1248	1220	1245	
		723	3	1125	1261	1278	1305	
Cindy Bulky	42	719	5	1090	1165	1095	1093	
		723	7	1056	1163	1124	1146	

150 Run

719	1197
723	1259

	average
50 Run	1217
100	1240
150	1228

Bad 50+100

14 723 gained average 6+8

5 " lost " 5

average gain 32 ?

or 5 Sump per A 4

Average at
50 – 1252
100 1217

1166 –

100 Run average

718	719	723
1199	1166	1247

Daily Experiments with Black Oxide flocker H. no peacock

Time	COLD	50	100	150	200	Flock
718 59	1192	1301	1296	1236		Ox black H holder
719 62	1204	1227	1195	1100		H2SO4 pipe weak
723 65	1172	1237	1290	1241		4 hour 800
718 68	1119	1252	1255	1222		
719 71	1074	1149	1161	1105		2 hours 800
723 74	1062	1178	1224	1187		
718 77	1156	1282	—	1145		flocks burnt
719 80	1141	1217	1208	1130		
723 83	1098	1244	1268	1185		1 hours 800
718 86	1171	1276	1259	1169		Pa Replaced H not good
719 89	1136	1202	1175	1104		pipe not weak
723 92	1132	1226	1272	1217		4 hour 800
718 95	1196	1299	1267	1115		
719 98	1181	1239	1162			
723 101	1172	1287	1359			2 h 800
718 104	1201	1273	1271			Replaced Ox H pipe weak
719 107	1195	1231	1238			
723 110	1180	1250	1301			2 H 800
718 113	1217	1301	1190			
719 116	1266	1248	1209			
723 119	1239	1273	1280			4 H 800
718 122	1211	1309	1290			
719 125	1249	1256	1243			
723 128	1209	1257	1308			1 H 800
718 131	1188	1297	1298			Replaced H weak with pipe clean
719 134	1206	1209	1219			
723 137	1192	1234	1268			4 h 700
718 140	1210	1315	1300			
719 143	1148	1215	1212			
723 146	1130	1234	1268			2 h 700
718 149	1236	1267	1048			
719 152	1186	1239	1184			
723 155	1156	1271	1234			1 H 700
718 158	1221	1256	1008			Replaced Ox H with pipe clean
719 161	1255	1224	1045			Flake fragm
723 164	1197	1259	1105			4 h 1000
718 167	1232	1290	1136			
719 170	1231	1248	1080			
723 173	1203	1308	1289			2 h 1000
718 176	1220	1183	970			
719 179	1224	1221	1043			
723 182	1195	1238	1032			1 h 1000

		COLD	50	100	150	200		
7/18	185	1111	1209	1011				Rabbit H by Naolt Chemical Co
7/19	188	1093	1159	924				4 h 1000
7/23	191	1088	1214	975				
7/18	194	1130	1330	1286				Rabbit injected 5/29 100 cc H by Naolt Lot 13 in ear Injected orally 4 months
7/19	197	1091	1291	1343				24 800
7/23	200	1047	1272	1329				
7/18	203	1127	1298	1319				Hooks Slightly heavy bones
7/19	206	1090	1270	1279				4 h 700
7/23	209	1040	1265	1300				
7/18	212	1141	1311	1326				Tough sheath water purified
7/19	215	1097	1247	1221				4 h 800
7/23	217	1029	1248	1285				
7/18	221	1122	1292	1289				
7/19	224	1201	1231	1229				24 800
7/23	227	1186	1244	1292				

averages
50 Rum 1262
100 " 1217

Experts Continued -

As according to Archer Gulley - it is evidently hard as breaks or cracks flake at Edges + The heavy loading weights of green of right hand probably depends upon the reduction of a high hydration as in old green to a lowed hydration as in 723 + which is only attained by long drying. -

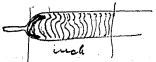
Old green also the flake dont stick to it like 723 = also the green stuck hard to the walls of tube - probably tube was not dried enough -

I notice even in 723 that there are green lumps which are evidently harder than the general mix
This distorts + makes floor of dump uneven + it probably comes from bad drying arrangements
I should be got rid off -

The thickness of flake clucks varies from 8 to 10 flakes thick

In using 4.9 104 flat flake it distributes fairly well for lower part of tube but when you approach the top the flake is so short that it comes down in a hump or humps or these are thrown to one side of the tube & makes it very bad, this action dont take place anywhere near so much when 4 or 4.2 ff is used — for some reason 7/8 green is worse than 7/23 but am not sure of this if it is true then 7/8 has more friction or something & tried an experiment of blowing air from atomizer down the side of the hopper this breaks up the clots of flake, will try up to make tubes with the air — going to try puffs of air & continuous stream of air —

The old way of cupped cap is very bad on top with tapered green it shows displacement one inch down



The new flat top is a great improvement & type 6 cable that of 6 can be used on the balloon it would be a further one

Lot 104 long flake 2 mm Copper not ox or fe;

20 milgms gives 673 flakes
104 greenly " 509 " but broken + turned + smaller
104 134 flakes to 4 milg dump
greenly 108 " " "
but on acct of small flakes turned over
probably less than 85 32% more
flake surface per dump in 104 f to greenly
of Cooks

Green that has water in it containing 20% glycerin + water evaporated under green feels dead dry - so internally lubricated - Results are that the flowing properties thus given is bad do the column of mix is easily displaced by contained blows of the plunger or it cracks or breaks at several points Especially at the top, It is evident green should have minimum flowing properties that the thickness of the green section should be diminished as far as practicable to restrain the flowing or displacement tendency + that the green itself should be dense so as not only to restrain

flow but to increase the amount of Nickel in each layer (12) in weight that in back — or

Tests of a tube with index shows that about like great resistance the mix will expand 1/10th of an inch on charge — one third of this due to putting in 30% KOH & LiOH. without current —
This shows that there should be a good top cap with no space whereby mix can flow into thereby displacing flake from the walls —

Req short tubes (old) soaked.
6 tubes in gallon 21% KOH for a week gave not a trace of LiOH in the gallon — the assay of tubes showed over .700 mlg per tube of 1.800 mlg KOH per tube Holland has the Record — this is about 1 gram per long tube that stays in fm KOH 21% — Holland

tests of beg cell in water
changed from time to time
showed L.O.H. kept coming out
after KOH was practically
all removed — but he has succeeded

Greyish-yellow gross — It flowed too
well, flowing gross is bad —

If flocks is thrown in tube is doubt
which is the case with present filler
when 4:2 or more of lot 104 is used
these doubts separated by falling
when tube is 1/2 filled but as it
gets near top the air doesn't get a
chance to separate the flakes
& they are thrown to one side

Now this forms a cup
& when the gross drops

the side X gets little the most as at S
hence this side gets pounded harder
& spout is and needles when column
cracks towards the spongy side as at m.

It is very essential that the flakes are all fresh as they fall from the feed hedge. The piling up is caused by hedging the slot where feed rod pushes through after a continual sizz & varying the feed by giving more movement to rod this forces much more flake through the aperture & is crowded & cakes together. If variable feed of flake is required do it must thicken the plunger & raise the gate to correspond & not change the strokes =

← Breaking of flake

appears to be due to bad flake feed piling up on one side. Is from a cup & this reacts to cause grown to be thrown to one side & here the hardest blows come & break the flake near tube sides. This is not always true

by samples cut open as one tube 739 - 19.8 opens 3.5 at 104 ft shows these diagonal breaks but I approached that the flake is piled up on other side - if not + 3.5 followed that chart - then the column is to work at 1.0

and a fuller piece put in 1/2 way up
Chamber Bore the previous thing

drink about 24/1000 inch

This will give an even floor to start on a 20 Column on with Even pressure + flat, Probably 2 would be better =

19.8 Green 739 – 3.6 fl lot 104 the flake marked with little graphite, ⊡ 4 pieces like this, filled fine

Turned up fine on both sides – no diagonal cracks – If graphite OK it will be a peach – It may be it only a coincidence that its not due to the graphite –

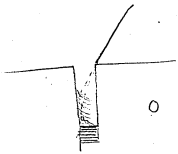
It seems that we cannot get an even floor with particles thru 20 think must have either thru 30 or 40

which will be more in proportion to the thickness of the sections, so there will not be so much crushing of large particles which serve to warp & deform the flow of flake forming the drink as well as disturb the layers below –

Corrugated flake is no its very much stuck together feeds bad & gives poor cohesion –

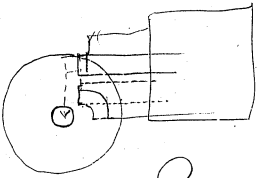
So far basket flake with natural bow of the flaking drum & all wheat & malt turned over or fine is the best & the tougher & more elastic the better —
but there should be a feed that dont cut sections or a higher fall for the top part of the tube —

Another Bug –



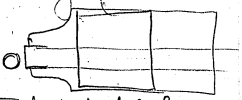
On account of the angle hopper there is a point in the tube where the flake piles up on one side & its always at the same place by cutting the tube at the right place it is found. Cut it anywhere hopping you only get it by accident =

The flake should fall nearly perpendicular, the rear on out machine is unnecessarily to one side on the flake is at wow used when we mixed flake & green together



This is way it is now with Fred O. It is changing it to dotted marks then the flake will fall nearly perpendicular, + through the air instead of over the side of a hopper any clotting that occurs will breakup most likely if feed slat down pencil it immediately —

Later — we are changing it thus



direct outside to get a perpendicular drop — for flake —

Since the fine green fines than 180 mesh
Can be flaked back to size required
or pressed in Hydraulic presses moistened
with water & dried so it can be successfully
it makes it commercially possible
to use green with cement. Cement will
work fine in the Hopper & distribute
evenly over the floor of the mix
with Cake

This will be a great aid to Everything
of the Cake =

There is no doubt but every Cake
we have ever made has of the dumped
on the side commencing an inch from the
top + ceasing 1/4 from the top —
This has been a very bad thing.

~~[illegible]~~

The 8 Rings on a long tube weigh
538 milligrammes

If 11 rings were used on perfting not,
spiral tube - but seam straight like rings
would be 3/8 apart & make use of
of Gallery - 25 grms -

I think this will be as strong as a
spiral tube, The seam will be
shorter & thus save weight & also
permit more mix to go in = It
also leads itself to solving that
infernal flake proposition of Contact
which like tube as I can use a
different plunger - also It
easier to manufacture

If lean green is used so it will
not burn up so much at tube
Contact & thus displace flake
it will be thus supposing we
keep flake constant

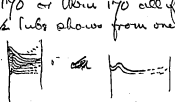
24 green	4 fl	190 grms per cell	
18 "	4 fl	253	63 grms more 1/4
16 "	4 fl	305	115 " "

If flake Contts 100 then 18 green Coal 14 Contts Edm
16 " 26 " "

So far we have not succeeded in getting more than ½ of the flake flukes in contact with the tube as per sawed sample & microscope If I only could get 70% in contact I would start factory

Now we remember that we cant use a straight tube as it bends on plug must spiral it to correct bending due to seam However I can perforate it diagonal so that nothing holding the tube in spiral the rows of perforation will be horizontal —

When using Reg Gallery green 739 — and 50% smaller flake with green thus 160 on 170 or thus 170 all fluid in — the cut ½ tube shows from one end to the other

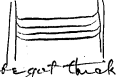


Evidently the green goes to one side then plunger comes green to flow above flake upto one side —

To obviate this green should be dumped in the Center of the tube — When we use Coarse material it dont go much to the sides as it lively & hard so the stratum is rather flat —

This seems to show that the dust should be taken out of green the 200 mesh - gravelly washed clean & dried well —

Tubs without spiral for one Experiment at least shows great Evenness & very little tendency for green to flow up the sides & make a dirty disturbing the flake — the Contracts are 60% or over — but there will be difficulty in making it I think — The spiral perhaps disturbs where the horizontal does not — The flake is however very thin at Edges



If it could be got thick the tube would be fast yet —

There is little doubt but that the layers are disturbed several deep, that the perforations is the principal cause of fill

5 dumps to a row of perfs
about 3½ dumps. 24. 4. between perforations, =

[ITEM FOUND IN BOOK]

12 A Ox+thrutt 30 f. — 1387. 150th Run
This tube is abnormal —
Bowl go black in acid except very slowly
acts like a good ff Tube + not like a bad
tube which shiny goes black —
Something to do with 1st Run treatment of
quiz — good tubes have mix cemented to acid
12A Slices easy ff black no sign of it —
perhaps this tube not fully developed —
Shows poor on outside not bright + few
flake surface — The flake has lost fire
+ is dull like poor tube but not so badly
broken — it shows flake up on one
side ~~up~~ fine

inner tube dull — holes not well filled
some hollow — not full flake —
Has good top end

Leadlit
8 OZ

This is the only tube Ox+N that is very
good — both tubes ff group good
It opens on seam very considerable
this week —

Bogatow
Has abnormal

[ITEM FOUND IN BOOK]

10268

outside bright metallic with coarse outside –
Slices every notice brown spot on each slice
as at B also around Edges flake cracked
away this would leave the center wasted
at Slices also – Bent go mummy black in
avid – where cavity open

dark shade in center

as fruit dried yellow

actual size

outside rough Soft more Metallic
yellow albedo / —
flakes in oblong seam little lumps
Same in 1021 —
Cover in all flakes not broken – ½ quart ½ broken –

Feb 29